

REMARKS

Claims 1-5, 7, 10-21, 25-29, 32-34, 37 and 40-44 remain pending in this application. Applicants now address each and every point raised by the Examiner in the above-identified office action as follows:

I. Rejection of Claims Under Section 103

Claims 1-5, 7, 10-21, 25-29, 32-34, 37 and 40-44 have been rejected under 35 U.S.C. § 103 as being allegedly unpatentable over Heinrich in view of Fujita.

A. Independent claims 1, 14 and 33

Applicants' invention as recited in independent claims 1, 14 and 33 comprises a low coefficient of thermal expansion material that includes a first phase of grains (e.g., formed from a carbide material), and a second phase of iron-based binder alloy consisting essentially of a blend of iron with Co, Ni, C and Mn. Further, a specific coefficient of thermal expansion is recited for this binder alloy as being 10 ppm/°C within a temperature range of from 100 to 700°C (claims 1 and 33).

As disclosed throughout the specification of this patent application, a key feature of Applicants' invention is that the binder alloy be formulated to provide a good degree of matching with the thermal properties of the first phase material. More specifically, that the binder alloy be formulated having a coefficient of thermal expansion that is closely matched to that

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of the first phase material in the sintered material to provide an improved degree of thermal shock resistance when used in a wear and/or cutting operation.

Accordingly, the listing of materials recited in the claims for formulating the binder alloy are those materials believed to be most useful in providing the desired degree of thermal coefficient matching to produce a cermet material having the above-described desired thermal performance property.

Heinrich discloses a cermet insert comprising a Co-Ni-Fe binder, wherein such binder was developed to replace a Co only binder for the purpose of avoiding problems due to the unavailability of Co, and providing improved corrosion resistance.

While Heinrich does disclose the use of a binder comprising Co, Ni and Fe, as noted by the Examiner, Heinrich fails to disclose or suggest the additional use of C and Mn to form the binder as recited in Applicants' claims.

The Examiner alleges that Fujita is in the same field of endeavor and that it discloses adding the additional alloying agents of C and MN to the binder.

Initially, Applicants submit that Fujita is not in the same field of endeavor as Heinrich. Fujita discloses a sintered alloy material used to provide improved wear resistance to a sliding member in an internal combustion engine. Fujita fails to disclose or remotely suggest a material useful for forming the rotary earth strata penetrating tool recited in Heinrich.

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Further, Heinrich discloses a cermet material comprising 81 to 95 percent by weight WC, and 5 to 19 percent by weight binder alloy. In contrast, Fujita fails to disclose or remotely suggest a cermet material. Rather Fujita discloses a metal alloy, consisting of a small amount (less than 10 percent) of alloying ingredients (e.g., C, P, Mn, Si, Ni, Cu, Mo, and Cr) and a remaining amount iron.

Accordingly, Applicants submit that one skilled in the art of engineering cermet materials used for making rotary earth strata penetrating tools would not be motivated to look to Fujita and its teaching of making metal alloys used in internal combustion engines. The two applications are completely unrelated as is the nature of the materials.

Further, neither Heinrich nor Fujita disclose or remotely suggest the particular use of C and MN as a binder alloy in a cermet composition to achieve the specific purpose of the invention noted above, that is to produce a cermet material having an improved degree of thermal shock resistance. This can only be done by using the binder materials recited in Applicants' claims that are specifically engineered to provide a desired degree of coefficient of thermal expansion matching with the first phase material. Thus, Fujita's alleged disclosure of using Mn to improve sinterability, and using C to improve toughness would provide no suggestion or motivation to one skilled in the art to include these materials for the purpose of matching the

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coefficient of thermal expansion with a first phase material, yet alone doing so in a cermet material.

For these reasons, Applicants submit that one skilled in the art of making cermet materials would not be motivated by the combination of Heinrich and Fujita to engineer the cermet material as claimed by the Applicants. For this reason, Applicants submit that its invention as recited in independent claims 1, 14 and 33 are not obvious based on the combination of Heinrich and Fujita, and respectfully request that the rejection of these claims, and the claims depending therefrom, under 35 U.S.C. § 103 be reconsidered and withdrawn.

Applicants further submit separately that the subject matter recited in dependent claims 3, 4, 5, 7, 11, 12, 16, 17, 18, 19, 20, 21, 34, 37, 41 and 42 is not disclosed or suggested by either Heinrich or Fujita alone or in combination.

For example, claims 7, 19 and 37 each recite the further feature that the binder alloy comprise 10 to 30 percent Co. Heinrich discloses that the Co content is greater than about 40 percent, and Fujita discloses a Co content that has no relevance to Applicants' claimed invention since Fujita fails to disclose a cermet material.

With respect to claim 41, this claim introduces in the cermet material the presence of a further ductile binder phase, which is not disclosed or even remotely suggested in either Heinrich or Fujita.

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B. Independent claim 25

Claim 25 recites a three phase low coefficient of thermal expansion cermet material; namely, one comprising a first phase of grains (e.g., a carbide), a second phase of binder alloy having a specified coefficient of thermal expansion, and a third phase comprising the first and second phases disbursed therein.

Applicants submit that neither Heinrich nor Fujita, alone or in combination, remotely disclose or suggest such three-phase cermet material. For this reason, Applicants submit that its cermet material as recited in claim 25 is not obvious to one having ordinary skill in the art over the combination of Heinrich and Fujita, and therefore respectfully request that the rejection of independent claim 25, and the claims depending therefrom, under 35 U.S.C. § 103 be reconsidered and withdrawn.

C. Independent claim 43

Claim 43 recites a low coefficient of thermal expansion cermet having a specific material microstructure comprising first and second structural phases. The cermet material comprises a number of structural units that are repeated within the material and that are each formed from the first and second phases. Neither Heinrich nor Fujita, alone or in combination, disclose or remotely suggest this invention feature.

Further, claim 43 recites that the ductile binder material, used to form the second structural phases, have a specific coefficient of thermal expansion property, also not

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disclosed or suggested in either Heinrich or Fujita alone or in combination.

Still further, claim 43 recites that the cobalt content in the ductile binder material be within the range of from 10 to 30 percent by weight. As noted above, Heinrich discloses that the cobalt content is greater than 40 percent.

For all of these reasons, Applicants submit that neither Heinrich nor Fujita, alone or in combination, remotely disclose or suggest the cermet material recited in independent claim 43. Thus, Applicants' invention recited in claim 43 would not be obvious to one having ordinary skill in the art based on the combination of Heinrich and Fujita. Applicants, therefore, respectfully request that the rejection of independent claim 43, and claim 44 depending therefrom, under 35 U.S.C. § 103 be reconsidered and withdrawn.

II. Conclusion

For the reasons presented above, Applicants respectfully request that the rejection of the claims under 35 U.S.C. § 103 be reconsidered and withdrawn, and that claims 1-5, 7, 10-21, 25-29, 32-34, 37 and 40-44 be passed to allowance.

The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply. Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that

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applicant has inadvertently overlooked the need for a petition
for extension of time.

If any additional fees are necessary in this matter,
please charge our Deposit Account No. 10-0440.

Respectfully submitted,

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